

### **REMARKS**

Claims 1-24 are pending. Claims 1, 4, 5, 6, 9, 10 and 21-24 are amended herein. Support for the amendments is at least found at page 5, paragraph [0017] and pages 8-9, paragraphs [0023]-[0025] and Fig. 1 of the specification.

#### **Applicants' Response to the Objection to the Specification**

The Office has maintained the objection to the title because it is not descriptive. Applicants' respectfully submit that the Title as amended is directed to the claims as currently presented, and is as short and specific as possible pursuant to 37 C.F.R. §1.72. Wherefore, applicants respectfully request either favourable reconsideration or further explanation of the objection.

#### **Applicants' Response to the Claim Rejections under 35 U.S.C. §102**

**Claims 1, 6, 21 and 23 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Shi et al. (US Patent 6,326,640).**

In response thereto, applicants respectfully submit that the present invention pursuant to amended parent claims 1, 6 and 21 are not anticipated for at least the reason that Shi does not teach all the features of the claimed invention. Further, the present invention of parent claims 1, 6 and 21 are not obvious in light of Shi for at least the reason that that all the features are not present in the reference nor is there any reason for a skilled artisan to modify the device of Shi so as to derive the currently claimed invention.

Specifically, Shi does not teach that an organic thin film overlies the buffer layer. The current Office Action switches the prior rejection's meaning of a buffer layer 24 and organic thin film 23 as recited within Shi. See Fig. 2. Further, the new Action asserts that the "specific sequential order is not claimed." See page 3, lines 5-7 of the Office Action. In response thereto, applicants have herein further specified within parent claims 1, 6 and 21 that the organic thin film overlies the buffer layer. As such, the specific ordering of the buffer layer and organic thin film is now recited within the claim language. Further, Shi does not allow for this arrangement as the reference requires the orientation film 23 to underlie the organic semiconductor film 24 in order to function as an orientation film. In other words, the orientation film 23 must precede the film 24 to serve as an orientation film. See col. 3, lines 15-27. As such, there is no reason whereby a skilled artisan would modify the arrangement of the films in Shi as doing so is contrary to the principle of operation thereof.

Wherefore, Shi does not anticipate claims 1, 6 and 21, as Shi fails to teach all the features of the present invention. Further, the claims are not obvious in light of Shi as any modification to the device thereof so as to read on the claimed invention would render the modified device inoperable as taught by Shi.

**Claims 1-3, 6-8 and 21-24 are rejected under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Kelley et al. (US 6,433,359).**

Applicants respectfully submit that Kelly does not anticipate the present invention at least for the reason that the reference fails to disclose all the features of parent claims 1, 6 and 21-24. Further, Kelly does not render the presently claimed invention obvious for at least the reason that it fails to teach all the features of parent claims 1, 6 and 21-24, and further does not provide a reason for one of skill in the art to modify the reference so as to derive the currently claimed invention.

The current Office Action asserts that the claims do not specifically define what constitutes acene system aromatics, and as such any of the listed materials in column 6 of Kelley meets the limitation of an acene system aromatic. See page 4, lines 1-3 of the Office Action.

Presently presented parent claims 1, 6 and 21-24 now distinctly recite that the acene system aromatics are either pentacene or pentacene fluoride. There is no teaching in Kelly of either pentacene or pentacene fluoride as the buffer layer, nor is there any reason for a skilled artisan to adopt these compounds.

As set forth in the previous amendment of March 18, 2008, Kelly teaches a self-assembled monolayer 16 is formed as an orienting film between an organic thin film 18 and a gate dielectric 14. See col. 5, lines 15-19. As described from col. 5, line 28 to col. 6, line 6, the self-assembled monolayer is comprised of a specific formulation (col. 5, lines 47-65) which bonds to the gate dielectric 14. Kelly's teaching of a self-assembled monolayer is extremely specific. The self-assembled monolayer of Kelly is shown by the chemical formula in column 5, lines 47-65. Its general equation is  $X-Y-Zn$ , wherein Z comprises C, H and other elements. The

buffer layer of the present invention is pentacene or pentacene fluoride, composed of only C and H and F.

Wherefore, the present inventions structure differs from Kelly's self-assembled monolayer. As such Kelly does not teach all the limitations of the present invention, nor would one of skill in the art modify the specific structure of Kelly's self-assembled monolayer as doing so would clearly destroy the intended function of Kelly.

**Claims 1, 6, 21 and 23 are rejected under 35 U.S.C. §102(e) as being anticipated by or in the alternative, under 35 U.S.C. §103(a) as obvious over Dimitrakopoulos et al. (US 2004/0161873).**

Applicants respectfully submit that Dimitrakopoulos does not anticipate the present invention at least for the reason that the reference fails to disclose all the features of parent claims 1, 6, 21 and 23. Further, Dimitrakopoulos does not render the presently claimed invention obvious for at least the reason that it fails to teach all the features of parent claims 1, 6, 21 and 23, and further does not provide a reason for one of skill in the art to modify the reference so as to derive the currently claimed invention.

Specifically, Dimitrakopoulos fails to teach a buffer layer is pentacene or pentacene fluoride, nor is there any reason for a skilled artisan to adopt these compounds in light of the teachings of Dimitrakopoulos.

The Office Action cites to Dimitrakopoulos teachings of a transistor with a buffer layer 18 and an organic thin film 16 on a substrate 10; wherein the buffer layer comprises acene system

aromatics citing to Figures 2-3, 5 and paragraphs [0046]-[0059]. Dimitrakopoulos teaches a monolayer 18 which is comprised either cyclic structures with an odd number of carbon atoms that are attached to the substrate surface through a single point of attachment [Figs. 5(a)-(e), (j)], or cyclic structures with an even number of carbon atoms that are attached to the surface through two points of attachment on adjacent ring atoms [Figs. 5(f)-(i)]. See paragraph [0059]. Dimitrakopoulos requires that there are bonding functional groups (Z) which attach the compounds to the substrate. See paragraph [0058]. This is distinct from applicants' invention which does not use similar functional groups as recited by Dimitrakopoulos. As such, Dimitrakopoulos does not teach that the acene system aromatics are either pentacene or pentacene fluoride, nor would one of skill in the art be able to adopt these compounds as they do not have the requisite functional groups (Z) of Dimitrakopoulos.

Wherefore, Dimitrakopoulos does not anticipate claims 1, 6, 21 and 23 as the reference does not teach all the features of the claims. Further, the claims are not obvious in light of Dimitrakopoulos as any modification to the device thereof so as to read on the claimed invention would render the modified device inoperable.

**Applicants' Response to the Claim Rejections under 35 U.S.C. §103**

**Claims 2, 3, 7 and 8 are rejected under 35 U.S.C. §103(a) as being unpatentable over Shi et al. (US 6,326,640) as applied to claims 1 and 6 above, and further in view of Hirai (US 2003/0160235).**

**Claims 4, 5, 9 and 10 are rejected under 35 U.S.C. §103(a) as being unpatentable over Shi et al. (US 6,326,640) in view of Hirai (US 2003/0160235) as applied to claims 3 and 8 above, and further in view of Afzali-Ardakani et al. (US 2004/0183070).**

Applicants respectfully submit that by addressing the rejections of claims 1 and 6 based on Shi as detailed above, likewise the rejections of claims 2-5 and 6-10 are addressed by nature of their dependency.

**Claims 3-5, 8 and 10 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kelley et al. (US 6,433,359) as applied to claims 1 and 6 above, and further in view of Afzali-Ardakani et al. (US 2004/0183070).**

**Claims 21-24 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kelley et al. (US 6,433,359) in view of Afzali-Ardakani et al. (US 2004/0183070).**

Applicants respectfully submit that in light of the amendments to claims 1, 6 and 21-24 as detailed above, the present invention as claimed is not obvious for at least the reason that the combined references would not lead one of skill in the art to derive the currently claimed invention.

As stated above, in regard to Kelly, as described from col. 5, line 28 to col. 6, line 6, the self-assembled monolayer is comprised of a specific formulation (col. 5, lines 47-65) which bonds to the gate dielectric 14. Kelly's teaching of a self-assembled monolayer is very specific. There is no teaching of pentacene as a buffer material. Afzali describes a solution comprising an "interpenetrating" mixture of a pentacene precursor and an n-type material which includes

soluble fullerenes. See paragraph [0070]. This mixture is coated on a substrate 100. As described in paragraph [0072] the coated film 120 is heated “to obtain the heterojunction between pentacene and the semiconductor material.” Hence, in Afzali, the semiconductor derived from the process is not comprised of a separate pentacene layer from the organic thin film layer 120. Rather, Afzali only teaches that the active layer 120 is a thorough mixture of the two components. Wherefore, Afzali does not teach a separate and distinct buffer layer as required by the parent claims.

Based on these combined teachings there is no reason whereby a skilled artisan would use a buffer layer which comprises pentacene as a separate layer from that of the organic thin film layer as required by applicants’ claims.

**Claims 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shi et al. (US Patent 6,326,640) in view of Hirai (US PUB 2003/0160235).**

In response thereto, applicants respectfully submit that the present invention pursuant to amended parent claims 21-24 are not obvious in light of Shi in view of Hirai for at least the reason that that all the features are not present in the reference nor is there any reason for a skilled artisan to modify the combination of Shi and Hirai so as to derive the currently claimed invention.

Specifically, as detailed above, Shi does not teach that an organic thin film overlies the buffer layer. Hirai does not provide any reason for making such a modification. Nonetheless, as noted above, Shi is not modifiable so as to have this configuration as doing so is contrary to the

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operation of the orientation film 23. Wherefore, applicants respectfully submit that by clarifying that the organic thin film overlies the buffer layer, this rejection is addressed for the same reasons as detailed above in response to the §102 rejections based on Shi.

**Claims 21-24 are rejected under 35 U.S.C. §103(a) as being unpatentable over Dimitrakopoulos et al. (US 2004/0161873) in view of Hirai (US 2003/0160235).**

In response thereto, applicants respectfully submit that the present invention pursuant to amended parent claims 21-24 are not obvious in light of Dimitrakopoulos in view of Hirai for at least the reason that that all the features are not present in the reference nor is there any reason for a skilled artisan to modify the combination of Dimitrakopoulos and Hirai so as to derive the currently claimed invention.

Claims 21-24 include the feature that the buffer layer is comprised of pentacene or pentacene fluoride. However, as noted above Dimitrakopoulos requires the presence of functional groups to bind the layers. Further Hirai does not provide any basis to modify Dimitrakopoulos so as to exclude the functional groups as doing so is contrary to the operation of Dimitrakopoulos's films. Wherefore, this rejection is addressed for the same reasons as detailed above in response to the §102 rejections based on Dimitrakopoulos.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.



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If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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